IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: **Syuushi NOMURA et al.** Group Art Unit: **1723**

Application Number: **10/500,042** Examiner: **Tony Glen Soohoo**

Filed: **June 23, 2004** Confirmation Number: **5201**

For: **FIELD CONVERTER AND FLUID PROCESSING DEVICE USING THE CONVERTER**

Attorney Docket Number: **042449**
Customer Number: **38834**

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Syuushi Nomura a citizen of Japan, hereby declare and state the following:

1. I graduated from Kyushu Institute of Technology of Kitakyushu-shi, Fukuoka, Japan in 1975 with a Bachelor degree in Engineering.

2. I am the author of the following papers: "Further Examination of Sterilization Power of the Water that passed through the Fluid Processing Device;" and "Measurement of Dissolved Hydrogen in the Water That Passed Through the Fluid Processing Device." Both papers are attached hereto.

3. I have reviewed and am familiar with the above-identified patent application as well as the Official Action dated December 1, 2006, in the application.

4. I have reviewed and am familiar with the contents of cited reference(s), U. S. Patent Nos. 3,747,656 to Mortus cited in the Official Actions in the above-identified application.

5. From the experimental results as set forth in the attached papers and those of the specification, I have concluded, among other things, that U. S. Patent Nos. 3,747,656 to Mortus does not teach or suggest the arrangement of material pieces as set forth in the application, nor the results obtained by this arrangement, nor would the arrangement be obvious to one of skill in the art based on the teachings of Mortus.

The undersigned declares that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Syuushi Nomura

Syuushi Nomura

Signed this 5 day of 02 (Month), 2007 (Year).

Further Examination of sterilization power of the water that passed through the fluid processing device

Shyuusi NOMURA

1. Introduction

An examination of sterilization power of the water that passed through the fluid processing device was carried out.

2. Experimental method

The fluid processing device used was the same fluid processing device that was explained in the description of WO 03/055591 A1 under the subtitle of example 4 of the embodiment and Fig. 6 and Fig. 7.

Distilled water (manufactured by Kanto Chemical Co., Inc.) was poured into an inlet of the fluid processing device and flowing water from an outlet of the fluid processing device by the action of gravity was colleted. The collected water was used following examination as the processed water.
The remainder of the distilled water, that is intact commercial distilled water, was used following examination as comparative examination.

0.1 ml of fungus liquid having viable cell count 10^7/ml were inoculated into 10ml of the processed water, and incubated at 20 ℃. As the comparative examination, 0.1 ml of the same fungus liquid having viable cell count 10^7/ml were inoculated into 10ml of the intact distilled water, and incubated at 20 ℃. The viable cell was counted after 1 hour, 3 hours, 8 hours and 24 hours from the inoculation.

The viable cell was counted by the way that an appropriate amount of the inoculated water was scattered into culture medium, and cultured, the number of produced colony were counted. In addition, in order to count the viable cell at the point of the inoculation, 0.1ml of the same fungus liquid were diluted into 10ml of phosphate buffer (1/15M, pH7.2). The phosphate buffer was made, using commercial distilled water. The viable cells at the point of the inoculation were counted using the same culture method.

The bacteria employed for the examination were Escherichia coli (IFO-3972),

Staphylococcus aureus (IFO-12732), Legionella pneumophilia (KB-1011), and Salmonella enteritidis (IFO-3313). The culture medium employed in the count of viable cell was standard agar medium (Eiken Chemical Co., Ltd.) and GVPC α agar medium (Nikkenn Bio Medical Laboratory Co., Ltd.).

The viable cell count at the point of the inoculation, was calculated by the means of one of the colony culture examination. The viable cell count after 1 hour, 3 hours, 8 hours and 24 hours, was calculated by the means of three of the colony culture examination.

3. Result and discussion

Examination results are shown in Table 1-1 to table 4-2.

Table 1-1 Result of Escherichia coli

Processed distilled water				
	1	2	3	MEAN
Beginning	$4.2X10^5$			
1 hour	$2.7X10^5$	$3.2X10^5$	$3.5X10^5$	$3.1X10^5$
3 hours	$2.4X10^5$	$2.4X10^5$	$1.6X10^5$	$2.1X10^5$
8 hours	ND	ND	ND	ND
24 hours	ND	ND	ND	ND

Table 1-2 Result of Escherichia coli

Intact distilled water				
	1	2	3	MEAN
Beginning	$4.2X10^5$			
1 hour	$5.6X10^5$	$5.7X10^5$	$5.6X10^5$	$5.6X10^5$
3 hours	$5.5X10^5$	$6.0X10^5$	$5.8X10^5$	$5.8X10^5$
8 hours	$4.1X10^5$	$4.8X10^5$	$4.3X10^5$	$4.4X10^5$
24 hours	$4.8X10^5$	$4.7X10^5$	$5.3X10^5$	$4.9X10^5$

In the Table 1-1 and 1-2, the unit of figure is CFU/ml and "ND" means not detected. The same are applied in the following Tables.

Table 2-1 Result of Staphylococcus aureus

Processed distilled water				
	1	2	3	MEAN
Beginning	$4.5X10^5$			
1 hour	$3.9X10^5$	$3.5X10^5$	$4.2X10^5$	$3.9X10^5$
3 hours	$1.9X10^5$	$1.5X10^5$	$1.5X10^5$	$1.6X10^5$
8 hours	$1.2X10^4$	$1.9X10^4$	$1.3X10^4$	$1.5X10^4$
24 hours	ND	ND	ND	ND

Table 2-2 Result of Staphylococcus aureus

Intact distilled water				
	1	2	3	MEAN
Beginning	$4.5X10^5$			
1 hour	$4.5X10^5$	$4.5X10^5$	$4.7X10^5$	$4.6X10^5$
3 hours	$4.6X10^5$	$4.2X10^5$	$4.5X10^5$	$4.4X10^5$
8 hours	$4.0X10^5$	$3.9X10^5$	$3.7X10^5$	$3.9X10^5$
24 hours	$4.3X10^5$	$3.9X10^5$	$3.9X10^5$	$4.0X10^5$

Table 3-1 Result of Legionella pneumophila

Processed distilled water				
	1	2	3	MEAN
Beginning	$4.6X10^5$			
1 hour	$3.1X10^5$	$3.8X10^5$	$3.5X10^5$	$3.5X10^5$
3 hours	$1.3X10^5$	$1.8X10^5$	$1.1X10^5$	$1.4X10^5$
8 hours	ND	ND	ND	ND
24 hours	ND	ND	ND	ND

Table 3-2 Result of Legionella pneumophila

Intact distilled water				
	1	2	3	MEAN
Beginning	$4.6X10^5$			
1 hour	$5.8X10^5$	$5.6X10^5$	$5.3X10^5$	$5.6X10^5$
3 hours	$5.2X10^5$	$5.5X10^5$	$5.6X10^5$	$5.4X10^5$
8 hours	$4.7X10^5$	$4.2X10^5$	$4.5X10^5$	$4.5X10^5$
24 hours	$4.2X10^5$	$4.5X10^5$	$4.6X10^5$	$4.4X10^5$

Table 4-1 Result of Salmonella enteritidis

Processed distilled water				
	1	2	3	MEAN
Beginning	$4.7X10^5$			
1 hour	$1.6X10^5$	$1.8X10^5$	$1.3X10^5$	$1.6X10^5$
3 hours	$5.3X10^3$	$5.5X10^3$	$4.9X10^3$	$5.2X10^3$
8 hours	$1.5X10^4$	$1.0X10^4$	$1.2X10^4$	$1.2X10^4$
24 hours	ND	ND	ND	ND

Table 4-2 Result of Salmonella enteritidis

Intact distilled water				
	1	2	3	MEAN
Beginning	$4.7X10^5$			
1 hour	$4.0X10^5$	$4.6X10^5$	$4.6X10^5$	$4.4X10^5$
3 hours	$4.2X10^5$	$4.5X10^5$	$4.4X10^5$	$4.4X10^5$
8 hours	$4.8X10^5$	$5.0X10^5$	$4.4X10^5$	$4.9X10^5$
24 hours	$4.7X10^5$	$4.9X10^5$	$4.4X10^5$	$4.7X10^5$

The processed distilled water showed sterilization ability against Escherichia coli, namely, after 8 hours from the inoculation, the viable cell disappeared shown in Table 1-1, while the viable cell number after 8 hours was about same as the beginning in the intact distilled water shown in Table 1-2.

The processed distilled water showed sterilization ability against Staphylococcus aureus, namely, after 24 hours from the inoculation, the viable cell disappeared shown in Table 2-1, while the viable cell number after 24 hours was about same as the beginning in the intact distilled water shown in Table 2-2.

The processed distilled water showed sterilization ability against Legionella pneumophila, namely, after 8 hours from the inoculation, the viable cell disappeared shown in Table 3-1, while the viable cell number after 8 hours was about same as the beginning in the intact distilled water shown in Table 3-2.

The processed distilled water showed sterilization ability against Salmonella enteritidis, namely, after 24 hours from the inoculation, the viable cell

disappeared shown in Table 4-1, while the viable cell number after 24 hours was about same as the beginning in the intact distilled water shown in Table 4-2.

The only difference between the examination i.e. incubation using processed water and the comparative examination i.e. incubation using intact distilled water, is the fluid processing. It is thought that the fluid processing device gives water such sterilization ability.

Measurement of dissolved hydrogen in the water that passed through the fluid processing device

Shyuusi NOMURA

1. Introduction

The author has frequently observed that small bubbles appeared on inner surface of vessel into which the water that passed thought the fluid processing device was put and left it as it was, for instance for 12 hours left from the point of putting into.
Therefore, the measurement of dissolved hydrogen in the water that passed through the fluid processing device, carried out.

2. Experimental method

The fluid processing device used was the same fluid processing device that was explained in the description of WO 03/055591 A1 under the subtitle of example 4 of the embodiment and Fig. 6 and Fig. 7.

Distilled water (manufactured by Kanto Chemical Co., Inc.) was poured into an inlet of the fluid processing device and flowing water from an outlet of the fluid device by the action of gravity was colleted. The dissolved hydrogen gas in the collected water was measured. The dissolved hydrogen gas in the remainder of the distilled water, that is intact commercial distilled water, was measured also.
The measurement was carried out just after the processing, after 24 hours of the processing and after 48hours of the processing.

The measurement apparatus was Gas chromatograph GC-390 manufactured by GL-Science, Co., Ltd., Japan.
The operational condition were as follows:
Column: GaskuroPack 54 60/80 5m manufactured by GL-Science, Co., Ltd., Japan
Column temperature: 40°C
Carrier gas: Nitrogen gas (N_2)
Carrier gas flow rate: 30.1mL/min
Detector : TCD

Detector temperature: 150°C
Injection temperature: 260°C
Sample injection volume: 100 μL

3. Result and discussion

The results of the measurement are shown in the Table 1

Table 1 the results of measurement

Sample		Dissolved hydrogen (ppb/l)
Processed distilled water	After 0 minutes	16
	After 24 hours	170
	After 48 hours	200
Intact distilled water	After 0 minutes	ND
	After 24 hours	ND
	After 48 hours	ND

In the table 1, ND means not detected. The detection limit was 1 ppb/l under the measurement.

In the processed water, the dissolved hydrogen was detected, while in the intact distilled water, the dissolved hydrogen was not detected, i.e. the amount of the dissolved water is lower than the detection limit.
In the processed water, the amount of the dissolved hydrogen becomes higher with the passage of time elapsed from 0 to 48 hours.

It is thought that small bubbles appeared on inner surface of vessel into which the water that passed thought the fluid processing device was put and left it as it was, are hydrogen gas.